**Answers to Spreadsheet Problems**

**Chapter 2**

S1. a and b. Setting MR = MC implies: 800 – 4Q = 200 + Q. Therefore, Q\* = 120 parts and P\* = $560.

c. To confirm these values on a spreadsheet, we maximize cell F7 by changing cell B7. Maximum profit in cell F7 is $16,000.

S2. a. Given π = 20[A/(A+8)] –A, it follows that Mπ = 20[8/(A+8)2] – 1. Setting Mπ = 0 implies (A+8)2 = 160, or A\* = $4.649 million.

b. Confirm this value on your spreadsheet by maximizing cell F7 by changing cell C7. Maximum profit in F7 is $2.702 million.

S3. a. To confirm these values on our spreadsheet, we maximize cell F7 by changing cell B7. The optimal sales volume is: Q\* = 2.4 million units and the optimal price is P\* = $210. Amazon’s margin on each reader is: 210 – 126 = $84, and its maximum profit (or, more precisely contribution) is $201.6 million.

b. We extend the spreadsheet by including contribution from sales of e-books ($100 per kindle sold) in cell G7 and add this to Kindle profit to compute total profit in cell H7. Maximizing total profit, we find the new optimal solution to be: Q\* = 3.829 million units and P\* = $160. (This price is close to current price levels for the Kindle.) By lowering price, Amazon increases its Kindle sales. The increased profit from e-books more than makes up for reduced Kindle profit. Note that e-book profit is almost three times Kindle profit. Amazon’s total profit comes to some $513.0 million.

**Chapter 3**

S1. a. and b. Using the constructed spreadsheet, vary price in cell B7 until the markup rule is satisfied – that is, cells E12 and F12 are equal. The combination of price and output satisfying the markup rule is: P\* = $560 and Q\* = 120 (the same answer as we found in Problem S1 of Chapter 2 using MR = MC).

c. Confirm this solution by using the spreadsheet’s optimizer. Maximize cell F7 by varying cell B7.

S2. a. and b. Using the spreadsheet, we optimize total revenue by maximizing cell E13 (equivalently E18) by changing cells C9 and D9 subject to E9 ≤ E5 (i.e. the number of seats sold must be no greater than the total number available). The optimal solution is QB = 240 seats, QT = 160 seats. The corresponding prices are PB = $420 and PT = $340, and total revenue is $155,200. At the optimal solution, we see that MRB = MRT (compare cells C14 and D14).

c. If the airline sets a single “value fare”, solve the spreadsheet by including the constraint that price cells C11 and D11 must be equal. The solution is QB = 347 seats, QT = 53 seats. The common price is $367, and total revenue falls to $146,667.

S3. a. The *MC per seat* is $20,000 per plane divided by 200 seats per plane, or $100. Setting MRB = MRT = 100, we have 540 – QB = 100 and 380 - .5QT = 100 implying QB = 440 seats, and QT = 560 seats. The corresponding prices are PB = $320 and PT = $240. To supply total demand of 1000 seats requires 1000/200 = 5 flights.

b. and c. It is straightforward to confirm the algebraic solution using the spreadsheet. Invoking the optimizer, maximize total profit in cell E18 by changing cells C9, D9, and E2, subject to E9 ≤ E5.